

09/502,454
DOCKET NO. F-9680

7

REMARKS

Claims 1-3, 5-10, 12 and 14-17 are all the claims presently pending in the application.

Claims 1-3 and 7 have been amended to more clearly define the invention. Claims 14-17 have been withdrawn from prosecution. Claims 1 and 16-17 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Entry of this §1.116 Amendment is proper. Since the Amendments above narrow the issues for appeal and since such features and their distinctions over the prior art of record were discussed earlier, such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this Amendment is believed proper and Applicant earnestly solicits entry. No new matter has been added.

Claims 1-3, 5-10, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Takao, et al. reference (JP 5-81846A), in view of the Bemis reference (U.S. Patent No. 5,487,160).

This rejection is respectfully traversed in the following discussion.

09/502,454
DOCKET NO. F-9680

8

I. THE RESTRICTION REQUIREMENT

The Office Action withdraws claims 14-17 from prosecution. However, as previously explained, the restriction requirement is *prima facie* improper because the Examiner has already searched all claims and all species. Therefore, the Examiner cannot allege that search and examination of the entire application poses a "serious burden" which meets the requirements of M.P.E.P. §803 because the Examiner has already performed the search.

In the October 1, 2003 Office Action, the Examiner alleges that "This is not found persuasive because Applicant has extensively amended claims, which requires further search in different area."

However, not only is the assertion that "Applicant has extensively amended claims" insufficient to allege a restriction requirement, the Examiner fails to recognize that the Examiner has already performed the search on claims 14-16 as amended.

Applicant last amended claims 14-16 on November 20, 2002. The Examiner issued an Advisory Action on November 27, 2002 and alleged that the amendments on November 20, 2002 raised new issues which require further consideration and/or search. Applicant then filed a Request for Continued Examination on December 12, 2002, to force entry of the November 20, 2002 amendment and to enable the Examiner to provide "further consideration and/or search."

The Examiner then performed a further search as evidenced by the PTO-892 that accompanied the Examiner's February 21, 2003 Office Action in which the Examiner considered the language of previously amended claims 14-16 and, indeed, rejected claims 14-16 under 35 U.S.C. § 103(a) as being unpatentable over the Takao, et al. reference (JP 5-81846A), in view of the Kau et al. reference (U.S. Patent No. 6,421,754).

09/502,454
DOCKET NO. F-9680

9

Applicant has not amended claims 14-16 since November 20, 2002 (which was entered on December 12, 2002) and the Examiner's February 21, 2003 Office Action in which the Examiner clearly indicated that the Examiner searched claims 14-16.

Therefore, the Examiner's allegation that claims 14-16 have been "extensively amended" such that they would require "further search in a different area" is blatantly false. The Examiner has already searched claims 14-16 as amended and, therefore, cannot allege that these same claims require search in a different area.

Applicant notes that claim 16 was amended on May 21, 2003, however, that amendment clearly did not substantively affect the scope of claim 16 such that a search would be required in a different area. Rather, claim 16 was merely amended to clarify that the third printed circuit board is "detachably connectable to an upper system" which is substantially similar to but more clear than being "separated from the upper system in structure." This amendment was provoked by the Examiner's refusal to provide any meaning to the words "separated in structure" that was recited previously by all independent claims. Therefore, the Examiner cannot allege that claims 14-16 require a different field of search based upon this amendment because this was the only thing that was amended in claim 16 and the same language was amended in claim 1.

Moreover, while the Applicant also amended claims 1-3, 5-10, and 12 in the May 21, 2003 Amendment, this fact is completely irrelevant as to whether claims 14-17 have been previously searched.

Lastly, the Examiner also has failed to allege a proper restriction requirement because the Examiner has failed to provide a prima facie showing of a serious burden by failing to provide "by appropriate explanation of separate classification, or separate status in the art, or

09/502,454
DOCKET NO. F-9680

10

a different field of search" (M.P.E.P. § 803). Indeed, the Examiner has not even attempted to provide any explanation at all regarding a different field of search. Applicant submits that any such allegation would be blatantly false because claims 14-17 have not been amended such that they would require a different field of search from that field that has already been searched.

Applicant respectfully requests withdrawal of the restriction requirement and/or rejoinder of claims 14-17.

II. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention, as recited by independent claim 1, is directed to a magnetic disk apparatus which includes a plurality of disk enclosures, a plurality of first printed-circuit boards which are paired with the disk enclosures, and a second printed-circuit board which is detachably connected to the first printed-circuit board via a cable. The first printed-circuit boards mount circuits which have a first noise resistance property, and a circuit which holds parameters unique to the disk enclosure. The second printed-circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. The second printed circuit board is also detachably connectable to an upper system.

A second exemplary embodiment of the claimed invention, as recited by independent claim 16, is directed to a magnetic disk apparatus which includes a disk enclosure, a first printed-circuit board which is paired with the disk enclosure, and a second printed-circuit board which is connected to the first printed circuit board via a cable and is separated in structure from the first printed-circuit board. The first printed-circuit board mounts circuits

09/502,454
DOCKET NO. F-9680

11

having a first noise resistance property, and a circuit which holds parameters unique to the disk enclosure. The second printed circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. The second printed-circuit board is separated into a third printed circuit board and a fourth printed circuit board in structure. The third printed circuit board is detachably connectable to an upper system and mounts an interface control circuit that interfaces with the upper system. The fourth printed circuit board is separated from an upper system in structure and mounts the circuits other than the interface control circuit.

A third exemplary embodiment of the claimed invention, as recited by independent claim 17, is directed to a magnetic disk apparatus that includes a disk enclosure, a first printed-circuit board which is paired with the disk enclosure, and a second printed-circuit board which is detachably connected to the first printed-circuit board via a cable. The first printed-circuit board mounts circuits have a first noise resistance property, and a circuit which holds parameters unique to said disk enclosure. The second printed-circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. Further, the second printed circuit board is detachably connectable to an upper system.

Conventional magnetic disk apparatus have only a single printed-circuit board for a single disk enclosure. Such single printed-circuit boards mount all of the circuits for controlling the disk enclosure. Thus, when the disk enclosure is exchanged for another disk enclosure, all of the circuits for each disk enclosure must also be exchanged because all of the circuits are on the same single printed-circuit board as the disk. This leads to a wasted cost in replacing all of the circuits for each disk enclosure and maintains a high cost for such a disk

09/502,454
DOCKET NO. F-9680

12

exchange. It also limits miniaturization of such a disk enclosure

By contrast, the present invention provides a disk apparatus which includes two separate printed-circuit boards. A plurality of first printed-circuit boards (e.g., 21 and/or 22 in the exemplary non-limiting embodiment of Fig. 2) includes the disk enclosure and is only required to also include those circuits which are unique to the disk enclosure (e.g., such as the exemplary parameter holding circuit 4 in Fig. 1). A second printed-circuit board (e.g., 23 in the exemplary non-limiting embodiment of Fig. 2) includes other circuits. Thus, when the disk enclosure requires an exchange with another disk enclosure, only those circuits on the first printed-circuit board are exchanged, thereby significantly reducing the cost of the exchange.

Additionally, a first exemplary embodiment of the present invention includes a switch for selecting either of one first printed-circuit board connected to the second printed-circuit board and another first printed-circuit board connected to the second printed-circuit board. Therefore, as shown exemplarily in Fig. 2, this first exemplary embodiment includes 1) one first printed-circuit board (21); and 2) another first printed-circuit boards. Both of these are detachably connected to the second printed-circuit board 23. The switch is on the second printed-circuit board 23 and board 23 is detachably connected to an upper system.

In addition to having all of the advantages listed above over the conventional disk apparatus, this configuration enables a single processor 28 to control the two first printed-circuit boards 21 and 22, thereby improving the capacity of the disk apparatus as well as improving the cost ratio of any exchange of the first printed-circuit board.

In the second exemplary embodiment of the invention as recited in independent claim 16, the second circuit board is separated into a third printed circuit board (e.g., 52 in the

09/502,454
DOCKET NO. F-9680

13

exemplary non-limiting embodiment of Fig. 3) and a fourth printed circuit board (e.g., 47 in the exemplary non-limiting embodiment of Fig. 3). The third printed circuit board 52 includes an interface control circuit 53 and the fourth printed circuit board 47 includes other circuits, such as a processor 49 and an SPM/VCM control circuit 40. This second exemplary configuration is advantageous over the conventional disk apparatus because it does not require the entire magnetic disk apparatus to be changed when the interface format changes. Only the third printed circuit board is required to be changed when the interface format changes.

III. THE PRIOR ART REJECTION

The Examiner alleges that the Bemis reference would have been combined with the Takao et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different matters and problems.

Specifically, the Takao et al. reference is directed to providing a magnetic disk device with superior portability and good accuracy by providing a first case 2a with a magnetic disk 11, a magnetic head 13, a disk driving means 12 and a head driving means 14 and a second case 2b having a logical operation circuit 6 (Abstract).

In contrast, the Bemis reference is specifically directed to the completely different and unrelated problem of "providing computer system disk storage backup concurrent with

09/502,454
DOCKET NO. F-9680

14

normal, on-line, operation of the disk storage device" (col. 2, line 66 - col. 3, line 2). In particular, the Bemis reference is concerned with addressing the problems of backing up ever increasing amounts of data while maintaining on-line availability of the data being transferred to a backup device (col. 2, lines 56-63). Therefore, one of ordinary skill in the art who was concerned with providing a magnetic disk device with superior portability and good accuracy as the Takao et al. reference is concerned with providing would not have referred to the Bemis reference because the Bemis reference is directed to the completely different and unrelated problem of providing computer system disk storage backup concurrent with normal on-line, operation of the disk storage device.

Indeed, the Takao et al. reference has absolutely nothing to do with how to backup data, let alone how to backup data on the type of Redundant Array of Inexpensive Disks (RAID) that the Bemis reference is directed to solving. Thus, the references would not have been combined.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner does not even support the combination by identifying a reason for combining the references.

The Examiner alleges that it would have been obvious to one of ordinary skill in the art "to implement a second disk enclosure into the apparatus thus obtaining more approaches for storage of information" (emphasis added). However, even assuming arguendo that one of ordinary skill in the art would have been motivated to make the alleged modification, the modification would not provide the features that are recited by independent claim 1.

Firstly, adding another disk enclosure would not remedy the deficiencies of the Takao et al. reference. The Takao et al. reference does not teach or suggest a switch on a second

09/502,454
DOCKET NO. F-9680

15

printed circuit board for selecting between first printed circuit boards that each correspond with a disk enclosure.

Therefore, while the Examiner's alleged modification of adding another disk enclosure, might remedy the deficiency of the Takao et al. reference in relation to providing a plurality of disk enclosures, the Examiner's alleged modification does not remedy the deficiency of the Takao et al. reference in relation to providing a switch on a second printed circuit board for selecting between a plurality first printed circuit boards.

Additionally, the Examiner continues to allege that the Takao et al. reference shows a second printed-circuit board 2b that is detachably connectable to an upper system. While the Applicant pointed out that in the Applicant's last response that, contrary to the Examiner's allegations, the Takao et al. reference does not teach or suggest the features of the present invention including the second printed circuit board being detachably connectable to an upper system, the Examiner appears to assert that "In a commonly used personal computer, the second printed-circuit board is a disk driver control card which is detachable (sic) connectable to an upper system (the mother board)."

In other words, the Examiner appears to be admitting that the Takao et al. reference does not teach or suggest the second printed circuit board being detachably connectable to an upper system, however, the Examiner appears to be alleging that this feature is "well known."

Therefore, pursuant to M.P.E.P. 2144.03 Applicant hereby submits a "demand for evidence" that either includes a citation to a reference in support of the Examiner's allegation or, if based upon the Examiner's personal knowledge, a statement of specific facts that are supported by an Affidavit from the Examiner.

As explained previously, the Takao et al. reference discloses that the second case 2b is

09/502,454
DOCKET NO. F-9680

16

“incorporated into a personal computer main body” and as shown in Figs. 11 and 12. The Examiner refers the Applicant to Figs. 4 and 5 of the Takao et al. reference in an attempt to allege support for a disclosure which shows that the second case 2b is separated from an upper system in structure. However, Figs. 4(a), 4(b), 5(a) and 5(b) clearly show that the second case 2b forms a portion of the upper system.

In particular, Figs. 4(a), 4(b), 5(a) and 5(b) show that the second case 2b has wavy lines on the left side of these figures. Those wavy lines are used to illustrate that the portion being illustrated has been broken away for the purpose of illustration, but that the these portions are actually integral with the portion which is not being illustrated.

Therefore, as admitted by the Examiner, the Takao et al. reference does not teach or suggest a second printed circuit board which is detachably connectable to an upper system.

Additionally, in the Examiner’s “Response to Amendment” section of the October 1, 2003 Office Action, the Examiner’s “response to applicant’s argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e. the features recited above) are not recited in the rejected claim(s).” (Emphasis added). However, contrary to the Examiner’s allegation, all of the features of applicant’s invention which the applicant has argued are not taught by the applied references are recited by the claims.

Specifically, in the Applicant’s May 21, 2003 Amendment, Applicant asserted that the applied references do not teach or suggest the feature of the second printed circuit board being detachably connectable to an upper system (see page 11 - 12). This feature is specifically recited by independent claim 1. Therefore, contrary to the Examiner’s allegation, all of the features of applicant’s invention which the applicant has argued are not taught by

09/502,454
DOCKET NO. F-9680

17

the applied references are recited by the claims.

Lastly, the Examiner admits that the Takao et al. reference does not teach or suggest a switch for selecting one of a plurality of first printed-circuit boards. However, the Examiner alleges that the Bemis reference remedies this deficiency.

Contrary to the Examiner's allegation the Bemis reference does not teach or suggest a switch on a second printed circuit board for selecting one of a plurality of first printed-circuit boards.

The Examiner appears to confuse the distinction between the claimed magnetic disk apparatus that includes disk enclosures with the plurality of disk enclosures that appear to be disclosed by the Bemis reference.

Independent claim 1 recites that the magnetic disk apparatus of the present invention includes disk enclosures, first printed circuit boards that are paired with respective disk enclosures, a second printed circuit board that has a noise resistance property that is superior to the first printed circuit boards, and a switch on the second printed circuit board for selecting one of the first printed circuit boards.

In other words, the present invention may split the circuits that are required for accessing the data in a disk enclosure across two printed circuit boards. The second printed circuit board includes those circuits that have a noise resistance property that is superior to those circuits that are mounted on the first printed circuit board.

In stark contrast, the Bemis reference discloses a redundant array of inexpensive disks that include a disk array controller 100 that communicates with a plurality of disk drives 135A - 135F (Fig. 1). As shown in Figs. 3A and 3B, the disk array controller 100 includes drive bus switches 400U and 400L and which "coordinates the operation of the multitude of

09/502,454
DOCKET NO. F-9680

18

disk drives within the array to perform read and write functions, parity generation and checking, and data restoration and reconstruction." Therefore, the Bemis reference does not teach or suggest that the disk array controller 100 corresponds to a second printed circuit board which includes circuits that have a noise resistance property that is superior to those circuits that are mounted on a first printed circuit board.

Indeed, the Bemis reference does not mention anything at all relating to the separation of circuits which have a superior noise resistance property (such as, for example, a processor, a spindle motor/voice coil motor control circuit and the like) onto a second printed circuit board and those circuits having an inferior noise resistance property (such as, for example, a recording/reproduction control circuit, an analog/digital converter, and the like).

Therefore, the "switch" that the Examiner appears to allege is disclosed by the Bemis reference does not switch between printed circuit boards which have circuits allocated to them based upon a noise resistance property. Rather, the Bemis reference appears to disclose a switch that merely selects between disk devices which each include all of the circuits regardless of their noise resistance properties.

Therefore, the Examiner is respectfully requested to withdraw this rejection of claims 1-3, 5-10, and 12.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-3, 5-10, 12 and 14-17, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest

09/502,454
DOCKET NO. F-9680

19

possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

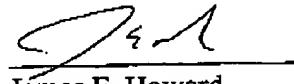
Date: 12/19/03


James E. Howard
Registration No. 39,715

McGinn & Gibb, PLLC
8321 Old Courthouse Rd., Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Amendment was filed by facsimile with the United States Patent and Trademark Office, Examiner Chen, Tianjie, Group Art Unit # 2652 at fax number 703-872-9306 this 19th day of December, 2003.


James E. Howard
Reg. No. 39,715